



2004 Physical Fitness Test Reference Guide

The “2004 Physical Fitness Test Reference Guide” is designed to assist school district and school staffs prepare for and conduct the administration of the test. This guide includes a detailed description of the fitness areas tested and the related performance standards, suggestions for facilitating the administration of each fitness test, and strategies for providing accommodations or modifications for students with disabilities.

Background

The California Physical Fitness Test (PFT) provides information that can be used by students to plan personal fitness programs, teachers to design the curriculum of physical education programs, and parents/guardians to understand their children’s fitness levels. This program also produces results that are used to monitor changes in the physical fitness of California students. By law (*Education Code* Section 60800), all school districts in California are required to administer the PFT annually to all students in grades five, seven, and nine.

The State Board of Education designated the FITNESSGRAM® as the PFT for students in California public schools. The FITNESSGRAM® is a comprehensive health-related physical fitness battery developed by The Cooper Institute for Aerobics Research. The primary goal of the FITNESSGRAM® is to assist students in establishing life-time habits of regular physical activity.

FITNESSGRAM®

The FITNESSGRAM® is designed to assess six key fitness areas that represent three broad components of fitness: (1) aerobic capacity, (2) body composition, and (3) muscle strength, endurance, and flexibility. The third component is divided into four areas: abdominal strength and endurance, trunk extensor strength and flexibility, upper body strength and endurance, and flexibility.

Performance Standards

FITNESSGRAM® uses criterion-referenced standards to evaluate fitness performance which have been established to represent a level of fitness that offers a degree of protection against diseases that result from sedentary living.

Performance on each of the fitness-area tests is classified into two general areas:

- Healthy Fitness Zone
- Needs Improvement (i.e., not in the Healthy Fitness Zone)

The desired performance standard for each fitness-area test is the Healthy Fitness Zone (HFZ). Test results within the HFZ reflect reasonable levels of physical fitness that can be attained by most students. All students should strive to achieve a score within the HFZ for each fitness-area test. It is possible that some students score above the HFZ.

This guide describes the six key areas tested by the PFT. Following each description are tables that summarize the performance standards for the HFZ by age and gender. The numbers represent the lower and upper limits of the HFZ (see Tables 1 through 13).

Fitness Components and Tests

Aerobic Capacity

The aerobic capacity fitness area refers to the maximum rate that oxygen can be taken up and utilized by the body during exercise. This component of fitness is considered important because of the research that associates good aerobic capacity in adults with a reduction of many health problems. Three test options are provided to estimate aerobic capacity.

One-Mile Run. This test estimates aerobic capacity from running performance. Students are instructed to run a mile as fast as possible; however, walking is permitted for students who cannot run the total distance. The time taken to complete the run is recorded in minutes and seconds.

Table 1. HFZs for One-Mile Run

Age	Females minutes:seconds	Males minutes:seconds
10	12:30 – 9:30	11:30 – 9:00
11	12:00 – 9:00	11:00 – 8:30
12	12:00 – 9:00	10:30 – 8:00
13	11:30 – 9:00	10:00 – 7:30
14	11:00 – 8:30	9:30 – 7:00
15	10:30 – 8:00	9:00 – 7:00
16	10:00 – 8:00	8:30 – 7:00



Walk Test. This test is for use with students ages thirteen and older. The test estimates aerobic capacity from heart rate response to a one-mile walk. Students are instructed to walk one mile as fast as possible. Immediately after the walk, the heart rate is determined. This heart rate (heart beats per a 15 second time period) is used along with the total walk time (in minutes and seconds), and the weight of the student to estimate aerobic capacity. An aerobic capacity score (VO_2 max) is estimated by inserting age, gender, weight, mile walk time, and heart rate at the end of the walk into the Rockport Fitness Walking Test equation (see Figure 1). This score reflects the maximum rate that oxygen can be taken up and utilized by the body during exercise.

Table 2. HFZs for Walk Test

Age	Females $VO_{2\max}$	Males $VO_{2\max}$
13	37 – 45	42 – 52
14	36 – 44	42 – 52
15	35 – 43	42 – 52
16	35 – 43	42 – 52

Figure 1. Rockport Fitness Walking Test Equation

$$VO_2 \max = -.3877 (\text{Age}) + 6.315 (\text{Gender}) - .0769 (\text{Weight}) - 3.2649 (\text{Time}) - .1565 (\text{Heart Rate}) + 132.853$$

Age is in years

Gender is 1 for Males and 0 for Females

Weight is in pounds (lbs)

Time is in minutes

Heart Rate is in beats/minute

PACER (Progressive Aerobic Cardiovascular Endurance Run). This test estimates aerobic capacity from the number of laps (20 meters in distance) that are completed. Unlike the other two options, this test starts out easy and becomes progressively more difficult. Students are instructed to run as long as possible across a distance and at a specified pace set to music played from a tape or CD-ROM. (The required pace is also available without the music.) For this test, a set of parallel lines is drawn 20 meters apart. Students start on one line, run the distance, and touch the opposite line with both feet. Once they hear the sound of a single beep, students turn around and run back to the starting

line. Every minute, indicated by a triple beep, the pace gets faster. Students continue in this manner until they fail twice to reach the line before they hear the single beep.

Table 3. HFZs for PACER

Age	Females # laps	Males # laps
10	15 – 41	23 – 61
11	15 – 41	23 – 72
12	23 – 41	32 – 72
13	23 – 51	41 – 72
14	23 – 51	41 – 83
15	23 – 51	51 – 94
16	32 – 61	61 – 94

Body Composition

The body composition fitness area targets the various factors that contribute to an individual's total weight (i.e. percent of muscle, bone, organ, and fat content). Body composition tests estimate the level of body fat. This component of fitness is considered important because of the research that associates excessive fat content with health problems, such as coronary heart disease, stroke, and diabetes. FITNESSGRAM® provides two test options, described below, to estimate body composition.

Skinfold Measurements. This test estimates body fat by taking multiple measurements of the thickness of skinfolds on the triceps and calf. A device called a skinfold caliper is used to take these measurements. Using the Body Composition Conversion Chart (found in the FITNESSGRAM® Test Administration Manual), the measurements are converted to percentages of body fat.

Table 4. HFZs for Skinfold Measurements

Age	Females %	Males %
10	32 – 17	25 – 10
11	32 – 17	25 – 10
12	32 – 17	25 – 10
13	32 – 17	25 – 10
14	32 – 17	25 – 10
15	32 – 17	25 – 10
16	32 – 17	25 – 10



Body Mass Index (BMI). This test is not an estimate of body fat. Instead, it provides information on the appropriateness of a student's weight relative to his or her height. The BMI is not the recommended body composition test; however, there may be school district policies limiting skinfold measurements. Use of BMI does yield some useful information for body composition estimation, if used appropriately.

Table 5. HFZs for Body Mass Index

Age	Females BMI	Males BMI
10	23.5 – 16.6	21 – 15.3
11	24 – 16.9	21 – 15.8
12	24.5 – 16.9	22 – 16.0
13	24.5 – 17.5	23 – 16.6
14	25 – 17.5	24.5 – 17.5
15	25 – 17.5	25 – 18.1
16	25 – 17.5	26.5 – 18.5

The California Department of Education (CDE) also accepts measurements of body fat obtained from two devices, the bioelectric impedance and automated skinfold calipers.

Bioelectric Impedance. This device measures resistance to the flow of electrical current in the body. The device sends a weak electrical current through the body and generates an index of resistance. Electrical resistance is greater in fat tissue since less water is stored in fat tissue. The resistance value (along with other values, such as height, weight, age, and gender) is then used to estimate the percentage of body fat.

Automated Skinfold Calipers. This is a computerized version of the skinfold measurements described above. The computerized device is used to acquire, calculate, and display percentage of body fat together with computer-entered data, such as age and gender.

Muscle Strength, Endurance, and Flexibility

The muscle strength, endurance, and flexibility fitness area determines the health status of the musculoskeletal system (i.e., muscles and bones throughout the body). Balanced, healthy functioning of this system requires that muscles work forcefully (i.e., strength), over a period of time (i.e., endurance), and be flexible enough to have a full range of motion at the joints (i.e., flexibility). This component of

fitness is considered important because it can reduce potential restrictions in independent living as adults (e.g., chronic lower back pain).

To determine the health level of the musculoskeletal system, four major areas are tested: (1) abdominal strength and endurance, (2) trunk extensor strength and flexibility, (3) upper body strength and endurance, and (4) flexibility.

Abdominal Strength and Endurance

Abdominal strength and endurance is important in promoting good posture and correct pelvic alignment. The latter is important in the maintenance of lower back health. The Curl-Up is the only test that is used to determine this area of fitness.

Curl-Up. Students are to complete as many curl-ups as possible, up to 75 at a specified pace (20 per minute or one every three seconds). On a mat, students lie on their back with their knees bent at a 140° angle and their hands at their side, palms face down. Moving slowly, the student curls up, sliding fingers across a measuring strip on the mat (see Figure 2), and then curls back down until the head touches the mat. Students are stopped after completing 75 curl-ups or when the second form correction is made.

Figure 2. Curl-Up



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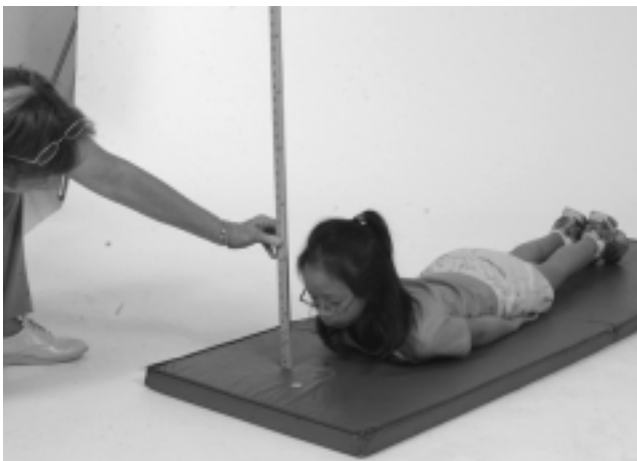
**Table 6. HFZs for Curl-Up**

Age	Females # completed	Males # completed
10	12 – 26	12 – 24
11	15 – 29	15 – 28
12	18 – 32	18 – 36
13	18 – 32	21 – 40
14	18 – 32	24 – 45
15	18 – 35	24 – 47
16	18 – 35	24 – 47

Trunk Extensor Strength and Flexibility

Trunk extensor strength and flexibility is an important component of fitness because it predicts first time and recurrent lower back pain, a major source of disability and discomfort in the United States. Although risks of developing back pain are greater with age, awareness and attention to trunk musculature at early ages is important to reduce future risks. The Trunk Lift is the only test used to determine this area of fitness.

Trunk Lift. While lying face down on a mat, students are asked to slowly lift the upper body off the floor, using muscles of the back, to a maximum of 12 inches. Students need to hold the position for measurement (i.e., distance from the floor to the student's chin) as shown in Figure 3. During the test, students should be instructed to keep their eyes focused on a spot on the floor. Once the measurement is made, the student returns to the starting position. A second trial is conducted, and the highest score is recorded.

Figure 3. Trunk Lift**Table 7. HFZs for Trunk Lift**

Age	Females inches	Males inches
10	9 – 12	9 – 12
11	9 – 12	9 – 12
12	9 – 12	9 – 12
13	9 – 12	9 – 12
14	9 – 12	9 – 12
15	9 – 12	9 – 12
16	9 – 12	9 – 12

Upper Body Strength and Endurance

Upper body strength and endurance is an important fitness area because of reported benefits in maintaining functional health and good posture. Four options are available to determine upper body strength.

Push-Up. Students are instructed to complete as many push-ups as possible at a specified pace (20 push-ups per minute) as shown in Figure 4. Students are stopped when the second form correction is made or when they experience extreme discomfort or pain. The number of push-ups is recorded.

Figure 4. Push-Up

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**Table 8. HFZs for Push-Up**

Age	Females # completed	Males # completed
10	7 – 15	7 – 20
11	7 – 15	8 – 20
12	7 – 15	10 – 20
13	7 – 15	12 – 25
14	7 – 15	14 – 30
15	7 – 15	16 – 35
16	7 – 15	18 – 35

Modified Pull-Up. If access to the necessary equipment is available, this option is good to use. Students are instructed to successfully complete as many modified pull-ups as possible. The modified pull-up differs from the pull-up in that students perform the test by lying on their back directly under a bar. Students grasp the bar and pull up their upper body until their chin reaches a specified level, marked by an elastic band (see Figure 5). Students are stopped when the second form correction is made. The number of modified pull-ups is recorded.

Figure 5. Modified Pull-Up**Table 9. HFZs for Modified Pull-Up**

Age	Females # completed	Males # completed
10	4 – 13	5 – 15
11	4 – 13	6 – 17
12	4 – 13	7 – 20
13	4 – 13	8 – 22
14	4 – 13	9 – 25
15	4 – 13	10 – 27
16	4 – 13	12 – 30

Pull-Up. This test should not be used for students who cannot perform one repetition. Students who are able to perform one correct pull-up are instructed to correctly complete as many pull-ups as possible. Students hang on the bar with their arms fully extended. Students use their arms to pull their body up until their chin is above the bar (see Figure 6) and then lower their body again into the full hanging position. Students are stopped when the second form correction is made. The number of pull-ups is recorded.

Figure 6. Pull-Up**Table 10. HFZs for Pull-Up**

Age	Females # completed	Males # completed
10	1 – 2	1 – 2
11	1 – 2	1 – 3
12	1 – 2	1 – 3
13	1 – 2	1 – 4
14	1 – 2	2 – 5
15	1 – 2	3 – 7
16	1 – 2	5 – 8

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Flexed-Arm Hang. Students are instructed to hang with their chin above a bar as long as possible. Students are stopped when their chin drops below the bar or when the second form correction is made. The length of time hanging is recorded in seconds.

Table 11. HFZs for Flexed-Arm Hang

Age	Females seconds	Males seconds
10	4 – 10	4 – 10
11	6 – 12	6 – 13
12	7 – 12	6 – 13
13	8 – 12	12 – 17
14	8 – 12	15 – 20
15	8 – 12	15 – 20
16	8 – 12	15 – 20

Flexibility

Flexibility of the joints, both in the upper and lower body, is an important component of fitness because it is important in functional health. Two options are available to determine student's flexibility.

Back-Saver Sit and Reach. This test predominately measures the flexibility of the hamstring muscles. Students are instructed to reach the specified distance on the right and left sides of the body. Starting in a sitting position, with one leg extended (touching the box needed for this test) and the other leg bent, the student reaches forward with both hands along the scale of the box (see Figure 7). The student reaches four times and holds the position on the fourth reach for at least one second. The distance the student reaches is recorded, and the same procedure is conducted on the opposite leg. As a safety precaution, reach performance should be limited to 12 inches.

Figure 7. Back-Saver Sit and Reach

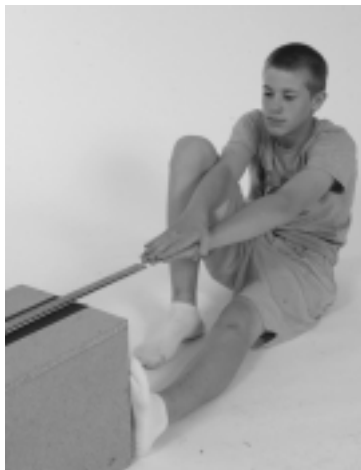


Table 12. HFZs for Back-Saver Sit and Reach

Age	Females inches	Males inches
10	9	8
11	10	8
12	10	8
13	10	8
14	10	8
15	12	8
16	12	8

Shoulder Stretch. This test measures upper body flexibility. Students are instructed to touch the fingertips together behind the back with one hand reaching over the shoulder and the other under the elbow as shown in Figure 8. Both shoulders are tested, and each is recorded separately.

Figure 8. Shoulder Stretch

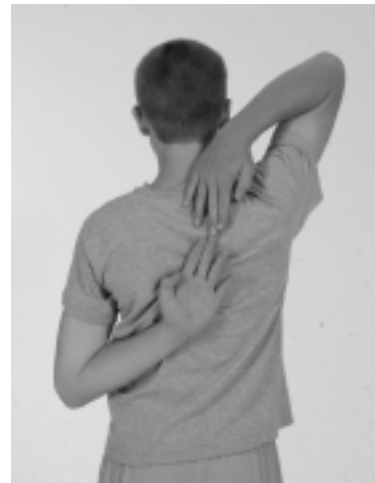


Table 13. HFZs for Shoulder Stretch

Age	Females & Males
All ages	Touching the fingertips together behind the back on both sides.

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Suggestions for PFT Administration

The following are general and test-specific administration suggestions for the PFT.

General

Most of the FITNESSGRAM® tests can be administered in a space equivalent to the size of most classrooms. While the test options for aerobic capacity require the greatest amount of space, one of the options, the PACER, only requires a space that can accommodate the 20-meter distance needed to carry out the test. Therefore, schools without physical education facilities should consider using one of the following:

- Classrooms, lunchrooms, auditoriums, or other similar spaces
- Physical education facilities on other school campuses
- Local park and recreation facilities

Aerobic Capacity

- Preparing for the test should include instructions and practice in pacing and in techniques for heart rate monitoring.
- Students should always warm up prior to taking the test and cool down after completing the test.
- To avoid potential invalid estimates, do not administer the test in unusually high temperatures and/or humidity or when wind is strong.

Body Composition

- Privacy should be provided to the student when taking skinfold measurements.
- Be sure the tester is familiar with the skinfold measurement methods.
- Whenever possible, the same tester should administer the skinfold measurements to the same students at subsequent testing periods.

Muscle Strength, Endurance, and Flexibility

- Curl-Up
 - Allow students to practice and learn the correct curl-up form.
 - Students should reposition themselves if the body moves and the head does not contact the mat at the appropriate spot or the measuring strip moves out of position.
- Trunk Lift
 - Students should not bounce during the test.
 - Do not encourage students to raise higher than 12 inches as excessive arching of the back may cause compression of the discs.

- Maintaining focus on the spot on the floor should assist in maintaining the head in the proper position.
- Push-Up
 - The test should be terminated if the student appears to be in extreme discomfort or pain.
 - The pace should be called or played on pre-recorded tape or CD-ROM.
 - Males and females follow the same protocol.
- Modified Pull-Up
 - Only arm movement is allowed. The body should be kept straight.
 - Movement should be rhythmical and continuous. Students may not stop and rest.
- Pull-Up
 - The body should not swing during the test.
 - Movement should be smooth (i.e., no kicking or jerking).
- Flexed-Arm Hang
 - The body should not swing during the test.
 - Only one trial is permitted unless the teacher believes that the pupil has not had a fair opportunity.
- Back-Saver Sit and Reach
 - The knee of the extended leg should remain straight. The tester may place one hand on the student's knee as a reminder to keep the knee straight.
 - Hips must remain square to the box. Do not allow the student to turn the hip away from the box as he or she reaches.

Testing Students with Disabilities

Certain accommodations or modifications may be provided for students with disabilities, who need special assistance on the PFT. Accommodations or modifications should be specified in the student's Individualized Education Program (IEP) or 504 plan. The Special Education Accommodations/Modifications for California Statewide Assessments chart provides a list of the types of accommodations that are available for the PFT. This chart is posted on the Internet at <http://www.cde.ca.gov/ta/tg/sa/>.

This section describes alternative activities, or modifications, to the FITNESSGRAM® test options that are designed to enable students with disabilities to participate in the PFT. Standards (i.e., Healthy Fitness Zones) for these activities, or modifications, are not available. These activities, therefore, should be used to establish baseline performance and to set individual goals. Any subsequent assessment should involve the same activity, the same equipment, and the



same surface or location used in the baseline test. Further, the guidelines provided may be modified based on individual capabilities.

Aerobic Capacity

The regular aerobic capacity test options present two problems for students with disabilities. Running is not appropriate for students who require some type of assistive device for mobility (i.e., wheelchair, braces), or who have visual impairments, leg amputation, congenital abnormalities, or arthritis. For students who have conditions such as asthma, cystic fibrosis, or congenital heart ailments, tests of the functional status of the cardiorespiratory system are not appropriate. In these situations, students with disabilities may participate in the aerobic capacity test by selecting one of the following four exercise options:

- Swimming
- Stationary bicycling
- Propelling a wheelchair
- Walking

The intensity of these exercises may be modified to ensure a student with disabilities is not placed at risk. If the intensity of the exercise must be modified, the recommendation is to change the rate of work so that the heart rate does not exceed 120 beats per minute.

Swimming. Swimming is appropriate for students who know how to swim or who use a flotation device. The score on the swimming test is the time taken to complete the distance. Recommended distances are as follows:

- 300 yards for younger elementary students
- 400 yards for upper elementary students
- 500 yards for middle school students
- 700 yards for high school students

Stationary bicycling. Pedaling the bicycle may be done with the arms or legs. The resistance should be set at a moderate level, and the student is scored on the number of pedal revolutions made or the distance covered in five minutes.

Propelling a wheelchair. The goal of this test is for the student to propel the wheelchair and cover a specific distance in the minimal amount of time possible. Recommended distances are as follows:

- 600 yards for younger elementary students
- 800 yards for upper elementary students
- 1,200 yards for middle school students
- 1 mile for high school students

Walking. The goal of this test is for the student to walk and cover a specific distance in the least amount of time possible. Recommended distances are as follows:

- 600 yards for younger elementary students
- 800 yards for upper elementary students
- 1,200 yards for middle school students
- 1 mile for high school students

All of the options described above involve the use of a large muscle mass; therefore, improvements in performance may be accepted as likely improvements in aerobic capacity.

Body Composition

The FITNESSGRAM® assesses body composition by using various approaches to determine percent of body fat (i.e., skinfold measurements, body mass index). Skinfold measurements can be taken of students with disabilities provided the test administrator does not use any of the following to take measurements:

- Triceps, calf, or any site with scar tissue or where repeated injections are received
- Limbs that have muscle atrophy

It is also permissible to use any side or both sides of the body to obtain the measurements.

Muscle Strength, Endurance, and Flexibility

The test of muscle strength, endurance, and flexibility can involve just about any movement the student can repeat in equal intervals and without pauses of longer than two seconds between repetitions. The number of repetitions and time are measured and used as a basis for evaluating progress on a subsequent test.

For additional information about the modifications to the FITNESSGRAM® tests, please read Chapter 6 of the FITNESSGRAM® Test Administration Manual entitled “Modification of FITNESSGRAM® for Special Populations.” The entire manual can be downloaded from the Internet at <http://www.cooperinst.org>.

Administration Resources

The FITNESSGRAM® Test Administration Manual, 6.0 Test Kit CD-ROM (software), and materials needed (i.e., skinfold calipers, PACER tape, or CD-ROM) to administer the tests can be purchased from Human Kinetics Company by calling (800) 747-4457. This manual includes a DVD with a video of all the test protocols.